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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/743,238

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Paul Mattackal Verghese

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08/03/2005

J GRANT HOUSTON  
AXSUN TECHNOLOGIES INC  
1 FORTUNE DRIVE  
BILLERICA, MA 01821

EXAMINER

CHANG, AUDREY Y

ART UNIT

PAPER NUMBER

2872

DATE MAILED: 08/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/743,238	VERGHESE, PAUL MATTACKAL	
	<b>Examiner</b>	<b>Art Unit</b>	
	Audrey Y. Chang	2872	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 10 June 2005.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Remark*

- This Office Action is in response to applicant's amendment filed on June 10, 2005, which has been entered into the file.
- By this amendment, the applicant has amended claims 1-11 and has newly added claims 12-17.
- Claims 1-17 remain pending in this application.
- The rejection to claims 1-11 under 35 USC 112, first paragraph, set forth in the previous Office Action is withdrawn in response to applicant's amendment.

### *Response to Amendment*

1. The amendment filed June 10, 2008 is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: **the newly added claim 14** recites that "first membrane comprises flexures enabling the electrostatic deflection of the first membrane and second membrane comprises flexures *enabling* the electrostatic deflection of the second membrane". The specification fails to provide the support for the "flexures" to enable the deflection of the membrane. The deflection is caused by electrostatic force not flexures.

Applicant is required to cancel the new matter in the reply to this Office Action.

### *Drawings*

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the feature concerning "an optical port *through* the

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substrate of at least one of the first membrane device” recited in **claim 8** and **newly added claim 17** must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

**The applicant’s respectfully reminded that the ports (22a and 22b) are NOT shown in Figure 1.**

***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. **Claim 14 is rejected under 35 U.S.C. 112, first paragraph**, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The reason for rejection based on newly added matters is set forth in the paragraph above.

### *Claim Objections*

5. **Claims 8, 10, 13 and 17 are objected to because of the following informalities:**

(1). The phrase “an optical port through the substrate of at least one of the first membrane device and the second membrane device” recited in claim 8 and **newly added claim 17** is confusing and indefinite since it is not clear what is considered to be the “optical port *through* the substrate”.

(2). The phrase “a voltage between the substrates of the membranes” is confusing and indefinite since the term “substrates” lacks proper antecedent basis from its based claim.

(3). It is not clear how could the first and second electrostatic cavity extends from the first membrane and the second membrane as recited in claim 13. What exactly are these cavities? Are they the “electrodes” for deflecting the membrane or they are defined by the membranes? If they are defined by the membrane how can they extend away from the membrane? The scopes and the language of the claims are really unclear.

**Appropriate correction is required.**

### *Claim Rejections - 35 USC § 102*

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. **Claims 1, 3-4 and 11 and added claim 12 are rejected under 35 U.S.C. 102(b) as being anticipated by the patent issued to Russell et al (PN. 6,382,953).**

Russell et al teaches a *Fabry Perot single cavity tunable filter* that is comprised of an *upper transparent layer* (22, Figures 2A and 3) serves as the *first membrane device* having a *membrane* for holding a *first mirror structure* (28) and a *lower transparent layer* (24) serves as the *second membrane device* having a *second membrane* holding a *second mirror structure* (30), wherein the second mirror structure is opposing the first mirror structure for defining a Fabry-Perot cavity (36) between the two mirror structures.

With regard to claims 3, 11 and **newly added claim 12**, Russell et al teaches that first and second membranes comprises electrostatic cavities (32, 34 and voltage source 48) for deflecting the first and second membranes by establishing a drive voltages between the first and second membranes. With regard to claim 4, the mirror structures held by the first and second membranes are of flat mirrors.

**This reference has therefore anticipated the claims.**

8. **Claims 1-2 are rejected under 35 U.S.C. 102(e) as being anticipated by the patent issued to Waters et al (PN. 6,763,718).**

Waters et al teaches a *tunable Fabry Perot interferometer cavity* that is comprised of a *wafer* (42, Figure 9) serves as the *first membrane device* having a *membrane* for holding an *upper mirror* serves as the *first mirror structure* and a *second wafer* (44) serves as the *second membrane device* having a second membrane holding a *lower mirror* serves as the *second mirror structure*, wherein the second mirror structure is opposing the first mirror structure for defining a Fabry-Perot cavity between the two mirror structures, (please see Figure 9 and column 6, lines 22-40). With regard to claim 2, a *spacer* is placed

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between the first and the second wafer or membrane devices for controlling a size of the Fabry-Perot cavity.

**This reference has therefore anticipated the claims.**

9. Claims 1, 5 and 9 are rejected under 35 U.S.C. 102(b) as being anticipated by the patent issued to Tayebati et al (PN. 6,438,149).

Tayebati et al teaches a *tunable single cavity Fabry Perot filter* that is comprised of a *top mirror support* (36, Figure 1) serves as the *first membrane device* having a membrane (37) for holding a *distributed Bragg reflector* (12) serves as the *first mirror structure* and a *substrate* (24) serves as the *second membrane device* having a *second membrane* holding a *distributed Bragg reflector* (10) serves as the *second mirror structure*, wherein the second mirror structure is opposing the first mirror structure for defining a *Fabry-Perot cavity* (8) between the two mirror structures, (please see Figures 1, 3F and 4G and columns 3, 6 and 9). With regard to claim 5, Tayebati et al teaches that one of the Bragg reflectors or the mirror structures (12) is *curved* with finite curvature, (please see Figure 1, column 6, lines 11-16). With regard to claim 9, Tayebati et al teaches that the mirror structures are distributed Bragg reflectors that comprise *dielectric* reflectors, (please see column 10, lines 65-67).

**This reference has therefore anticipated the claims.**

#### ***Claim Rejections - 35 USC § 103***

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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**11. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Russell et al in view of the patent issued to Fein et al (PN. 3,498,693, the true Author should be Markin Joseph et al).**

The Fabry Perot single cavity tunable filter taught by **Russell et al** as described for claim 1 above has met all the limitations of the claim with the exception that it does not teach explicitly that both of the first and second mirror structures are curved mirrors. **Fein et al** in the same field of endeavor teaches a cavity formed by two opposing reflector wherein the opposing reflectors **are curved** for eliminating unwanted spread of the light due to diffraction when undergoes multiple reflections between the two reflectors, (please see Figure 8, column 6, lines 69-75). It would then have been obvious to one skilled in the art to modify the first and second mirror structures of **Russell et al** to make them of curved mirrors for the benefit of reducing unwanted diffraction occurs between the light reflected off the two mirror structures to make the tunable filter more accurately operated.

**12. Claims 7-8 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Russell et al.**

The Fabry Perot single cavity tunable filter taught by **Russell et al** as described for claim 1 above has met all the limitations of the claims. **Russell et al** teaches that an electrostatic drive voltage is set up between the *two membrane devices* for holding the two mirror structures to cause the cavity size being adjusted therefore tuning the Fabry-Perot tunable filter. However this reference does not teach explicitly that the membrane device comprises a substrate and the membranes are being deflected by establishing drive voltage between the membrane and the substrate. However the essential requirement for the Fabry Perot tunable filter to be tunable is for the size of the cavity which defined by the separation distance between the two opposing mirror *structures*, to be adjustable by the drive voltage, whether to make the size variation by having the mirror structures moved *with* the substrate (as disclosed by **Russell et al**) or



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with *respect to* the substrate are really obvious modifications to one skilled in the art, (since it only involves modifications of placing the electrodes at different places). One skilled in the art would be motivated to make the first and second mirror structures movable with respect to the substrates for the benefit of allowing the substrates being parts of the application system intends to utilize the Fabry-Perot tunable filter (therefore save money to have extra parts) and just moved the mirror structures themselves to achieve the same tunable filtering function and without the need of moving the whole substrate and therefore requires less amount of electrostatic force needed for the tuning. With regard to claim 8, Russell et al teaches that a spectral layer (38 and 40, Figure 3) may be used to couple the incident and outgoing light (42 and 48) to enter and exit the Fabry-Perot tunable filter, these spectral layers can be identified as the optical ports through the substrates, (wherein the parts of the transparent layers 22 and 24 in contact with the spectral layers can be defined as the substrates).

**13. Claims 13-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Russell et al in view of the patent issued to Flanders (PN. 6,424,466).**

The Fabry Perot single cavity tunable filter taught by Russell et al as described for claim 1 above has met all the limitations of the claims.

Russell et al teaches that first and second membrane devices comprises elements for electrostatically deflecting the membranes, and therefore the mirror structures, away from Fabry Perot cavity, but it does not teach explicitly that the first and second electrostatic cavities *extend* from the first and second membranes and away from the Fabry Perot cavity. With regard to claim 16, Russell et al does not teach explicitly about the first and second membranes being deflected by electrostatic voltage that is set up between the first substrate and the first membrane and the second substrate and the second membrane respectively.

**Flanders** in the same field of endeavor teaches a Fabry-Perot tunable filter that is comprises of a first and second membrane devices having a first and second membrane (214, Figure 4) each holds a mirror coating or structure (250) with a mirror surface (230). Flanders teaches that each of the first and second membrane devices comprises a first and second *electrostatic cavities* (216') respectively such that the first and second membrane, and therefore the mirror structures, are capable of being extended away from the Fabry Perot cavity, (defined by the separation between the mirror surfaces). The extension of the cavities are achieved by establishing electrostatic force between a first and second support or substrate (210) and the first and second membrane respectively, (please see Figure 2 and column 4, line 54 to column 5 line 11). With regard to claim 15, Flanders teaches that the deflection of the membranes and the mirrors may be in opposite direction. With regard to claim 17, Flanders teaches that the first and second optical ports (240) are through the first and second substrate of support, (210). It would then have been obvious to one skilled in the art to apply the teachings of Flanders to modify the tunable Fabry-Perot filter structure of **Russell et al** to use *deflectable cavities* defined by the *membranes* as the means to move or deflect the mirror structures for the benefit of allowing the tuning the Fabry Perot cavity and therefore the Fabry Perot filter with more flexibility.

With regard to claim 14, these references do not teach explicitly to include flexures on the membranes. However the membranes either implicitly include certain flexures for creating the elasticity and flexibility or it is would have been obvious to one skilled in the art to add such for the benefit of making the membranes with more flexibility in moving the mirror structures.

#### ***Response to Arguments***

14. Applicant's arguments filed June 10, 2005 have been fully considered but they are not persuasive. The newly added claims have been fully considered and they are rejected for the reasons stated above.

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15. In response to applicant's arguments which stated the none of the cited Russell et al, Waters et al and Tayebati et al references discloses a *membrane* for holding the mirror structure the examiner respectfully disagrees for the reasons stated below. Firstly, the applicant fails to *define* what is considered to be a "*membrane*" in the specification and the specification only discloses that the membrane being a *layer* holding the mirror structures, all of the cited references teach to use a layer to hold mirror structures, all of cited references therefore read on such. Furthermore, the dictionary definition for the term "membrane" is "a thin, pliable sheet", (The Random House college Dictionary). All of the cited references show the layer holding the mirror structure is a thin and pliable sheet since the layer causes the mirror structures to be movable or deflectable. These references therefore reads on the feature concerning the "membrane".

#### *Conclusion*

16. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

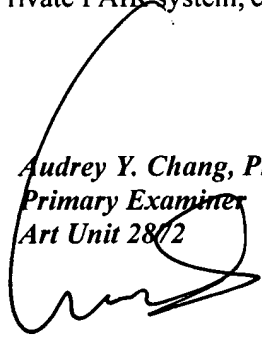
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Audrey Y. Chang whose telephone number is 571-272-2309. The examiner can normally be reached on Monday-Friday (8:00-4:30), alternative Mondays off.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on 571-272-2312. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

*Audrey Y. Chang, Ph.D.*  
*Primary Examiner*  
*Art Unit 2872*



A. Chang, Ph.D.